

Notice of Allowability

Application No.

09/891,610

Examiner

Huyen X. Vo

Applicant(s)

ZHOU, GUOJUN

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/10/2005.
2. ☒ The allowed claim(s) is/are 1-8.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

W. R. YOUNG
PRIMARY EXAMINER

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Guojun Zhou on 11/3/2005. The application has been amended as follows:

Claims 9-18 have been cancelled.

Claims 1-8 have been amended as follows:

1. A system, comprising:

a graph-decoder based speech recognition mechanism for recognizing a word sequence, from input speech data, based on a language model using a graph decoder, the graph-decoder based speech recognition mechanism having a recognition acceptance mechanism to determine whether the graph decoder based speech recognition mechanism fails; and

a keyword based speech recognition mechanism for recognizing when the graph-decoder based speech recognition mechanism fails, the word sequence, the keyword based speech recognition mechanism including:

a keyword spotting mechanism to detect, using at least one acoustic model, at least one keyword from the input speech data based on a keyword list; and

a keyword based recognition mechanism to recognize the word sequence using the at least one keyword, detected by the keyword spotting mechanism, based on the language model.

2. The system according to claim 1, wherein the graph decoder based speech recognition mechanism comprises:

a graph decoder for recognizing the word sequence from the input speech data based on at least one acoustic feature to generate a recognition result, the recognizing being performed according to the at least one acoustic model the language model; and

the recognition acceptance mechanism for determining whether to accept the recognition result generated by the graph decoder based speech recognition mechanism or to activate, when the recognition result from the graph decoder based recognition mechanism is not accepted, the keyword based speech recognition mechanism.

3. The system according to claim 1, further comprising an acoustic feature extractor to extract the at least one acoustic feature from the input speech data.

4. The system according to claim 2, wherein the keyword spotting mechanism is activated by the recognition acceptance mechanism, a keyword based recognition

mechanism for recognizing the word sequence using the at least one keyword, detected by the keyword spotting mechanism, based on the language model, if the recognition result from the graph decoder based recognition mechanism is not accepted.

5. A method, comprising:

recognizing, by a graph decoder, a word sequence from input speech data based on at least one acoustic features, the recognizing being performed using at least one acoustic model and a language model;

determining, by a recognition acceptance mechanism, whether to accept the word sequence or to activate a keyword spotting mechanism;

detecting, by the keyword spotting mechanism when activated, at least one keyword, according to a keyword list, from the input speech data based on the at least one acoustic model; and

recognizing, by a keyword based recognition mechanism, the word sequence using the at least one keyword, detected by the detecting, based on the language model.

6. The method according to claim 5, further comprising:

receiving the input speech data; and

extracting, by an acoustic feature extractor, the at least one acoustic feature from the input speech data.

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7. A computer-readable medium encoded with a program, the program, when executed, causing:

recognizing, by a graph decoder, a word sequence from input speech data based on at least one acoustic features, the recognizing being performed using at least one acoustic model and a language model;

determining, by a recognition acceptance mechanism, whether to accept the word sequence or to activate a keyword spotting mechanism;

detecting, by the keyword spotting mechanism when activated, at least one keyword, according to a keyword list, from the input speech data based on the at least one acoustic model; and

recognizing, by a keyword based recognition mechanism, the word sequence using the at least one keyword, detected by the detecting, based on the language model.

8. The medium according to claim 7, the program, when executed, further causing:

receiving the input speech data; and

extracting, by an acoustic feature extractor, the at least one acoustic feature from the input speech data.

Allowable Subject Matter

2. Claims 1-8 are allowed over prior art of record. The following is an examiner's statement of reasons for allowance: Hedin et al. (US 6185535) disclose a distributed

speech recognition system in that input speech received at client device is undergone processing and recognition at the client device. If the client device fails to recognize the input speech, the input speech is forwarded to the server for performing speech recognition (*referring to Hedin reference*). Takebayashi et al. (US 5794194) teach a keyword spotting mechanism for spotting keywords in the input speech using keyword dictionary (*referring to the reference*). Tsuboi et al. (US 5457768) teach a speech recognition apparatus comprises a speech input unit for receiving an input speech signal, analyzing it, and outputting a speech feature parameter series, a speech recognition unit for extracting a speech feature vector from the parameter series, and matching it with a plurality of predetermined words to output a series of word candidates used as keywords, a syntactic analysis unit for analyzing the series of the word candidates as the keywords according to syntactic limitation, and generating a sentence candidate (*referring to the reference*). The three references above, however, fail to specifically disclose the essential steps of performing speech recognition in a first graph-based speech recognizer, and if the first graph-based speech recognizer fails, input speech is forwarded to a second keyword-based speech recognizer for recognizing only keywords in the input speech. Recognized keywords together with language models are used to decode the whole input utterance. Furthermore, it would have not been obvious to one of ordinary skill in the art at the time of invention to modify the three references above either individually or combined to obtain the claimed invention. Therefore, claims 1-8 are allowed over prior art of record.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen X. Vo whose telephone number is 571-272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HXV

11/3/2005



**W. R. YOUNG
PRIMARY EXAMINER**
